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TASK GROUP ON COMPUTER/COMMUNICATIONS  
PROTOCOLS FOR BIBLIOGRAPHIC DATA INTERCHANGE:

Second Report

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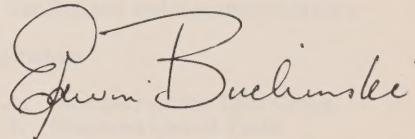
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September 6, 1985

Marianne Scott  
National Librarian  
National Library of Canada

As Chairman of the Task Group on Computer Communications Protocols for Bibliographic Data Interchange, I herewith present its second report. This report covers the activities and recommendations of the Task Group for the period January 1983 to December 1984, as well as a proposed list of tasks to be undertaken during the next two-year period.

Respectfully submitted,

A handwritten signature in cursive ink, appearing to read "E. Buchinski".

E. Buchinski  
Chairman



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## TABLE OF CONTENTS

1. Introduction	1
2. Assistance to NLC's Protocol Development Program	2
2.1 Network Directory Service (NDS)	3
2.2 Acquisitions	4
2.3 Interlibrary Loans (ILL)	4
2.4 Information Search and Transfer (IST)	6
2.5 File Transfer Protocol (bFTP)	7
3. Assistance to iNet Project Evaluation	8
4. OSI Issues Considered	9
4.1 Connectionless Protocols	9
4.2 Applications Interworking	11
4.3 Protocol Testing and Conformance	11
4.4 Library and Office Applications	12
4.5 Syntax of User Data	13
5. Other Activities	14
6. Conclusions and Recommendations	16
Appendices	
A: Members of the Task Group	18
B: Proposed List of Tasks	19
C: Notes and Abbreviations	21



## 1. INTRODUCTION

This report covers a period that saw a growing worldwide interest in the Open Systems Interconnection (OSI) philosophy and its techniques and a quickening tempo of detailed work on a number of OSI service and protocol standards. The adoption of an identical text of the OSI Basic Reference Model as both an ISO (International Organization for Standardization) and CCITT (Comité consultatif international télégraphique et téléphonique) standard,<sup>1</sup> was a notable achievement during this period, signifying universal acceptance of OSI and an era of active cooperation between the two organizations concerned with international standardization in computer communication. Thanks largely to this cooperation, Transport and Session layer service and protocol specifications have become international standards.

The architecture of the OSI upper layers has largely been clarified; several application layer protocols have been adopted by CCITT, while others have been proposed and are now under active consideration. The initial emphasis on connection-oriented communication has been tempered with the clear acknowledgement of the need for connectionless communication, and new work items have been initiated for the development of connectionless versions of OSI protocols. This report, however, does not deal with the technical content of the protocols which the Task Group is helping to define.

It is now recognized that the entire distributed applications environment must be brought within the purview of OSI even though not all aspects would be amenable to standardization. The ISO technical committee responsible for OSI standardization (TC97) has been reorganized to extend its scope of work into such areas as data base management, operating system command and response languages, computer graphics, text and office systems. Work items on OSI management including network directories have been initiated and are now being actively pursued.

This period also saw much activity in, and a corresponding widening scope of, the National Library's protocol development program. Several new projects were started and previous ones were completed or carried forward. All these developments – both external and internal to the National Library – were strongly reflected in the actual work program of the Task Group.

The Task Group was able to address all the tasks it had identified for action during this period<sup>3</sup>. In addition, the Group defined several new work items, clarified some major technical issues, and provided guidance for the future direction of protocol development. A list of the specific tasks the Task Group wishes to undertake during the next two-year period is included in Appendix B of this report.

## 2. ASSISTANCE TO NLC'S PROTOCOL DEVELOPMENT PROGRAM

A good deal of the Task Group's work during this period arose from several specific projects undertaken by the National Library. While the detailed work of service and protocol specification was contracted out, it was the Task Group's responsibility to see that the work done by the consultants was technically sound, met OSI requirements, and benefitted from similar work done elsewhere.

Modelling of distributed applications, and the design, specification and implementation of supporting OSI protocols is a relatively new and rapidly evolving discipline. The Task Group provided the library community with a forum for resolving technical issues and a sounding board for new ideas and concepts of library service. In the remainder of this section the Task Group's involvement in specific projects is outlined.

### 2.1 Network Directory Service (NDS)

The central role of a directory system in the effective functioning of any open systems network is now well recognized. The period under review saw both CCITT and ISO initiate new work items on directories. However, there is still no consensus as to the functional scope or the operational features of an OSI directory service, and stable specifications from CCITT and ISO seem at least two and possibly four years away. As work on several library applications progressed, the directory issue became a matter of some urgency, and the Task Group requested the National Library to develop a directory facility to support access to library services. The Task Group's view that standards for directories are essential was duly conveyed to the CCITT Study Group VII through its Canadian advisory committee. Thanks to this initiative, CCITT appointed an Interim Special Rapporteur on Directories to speed up work in this area.

At its March 1984 meeting, the Task Group reviewed a functional model of a network directory system (NDS) prepared by consultants on contract to the National Library. While recognizing the need for a network directory system of decidedly broader scope than was envisaged in the CCITT and ISO models, the Task

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- 1) For a description of these organizations and their activities, see Appendix C.
- 2) *Information Processing Systems – Open Systems Interconnection – Basic Reference Model*, ISO 7498-1984; *Reference Model of Open Systems Interconnection for CCITT Applications*, CCITT Recommendation X.200., 1984.

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3) See Task Group on Computer/Communications Protocols for Bibliographic Data Interchange, *Interim Report* (Ottawa: National Library of Canada, 1983), Appendix D.

Group nonetheless advised that the initial scope of the directory functional model be more limited and better aligned with the CCITT/ISO model.

The NDS functional model was fully developed and the service and protocol specifications were prepared in time for the November 1984 Task Group meeting. Two distinct categories of directory services were defined, one concerned with name-to-address mapping functions and the other with data base queries. In the Task Group's view, the name-to-address mapping functions require fast response that can hardly be satisfied by message-oriented protocols as proposed in the specification. The Group also advised that the specifications be reviewed and the protocols be restructured if necessary to align them with CCITT's message-handling protocols<sup>4</sup> and the NISO Information Retrieval Protocol<sup>5</sup> then under development. It was important, in the Task Group's view, to define the NDS protocols in such a way that both connection and message-oriented communication services could be used to transfer NDS protocol data units.

## 2.2 Acquisitions

This application, dealing with ordering and acquisition of library materials and involving libraries, booksellers and publishers, requires interchange of information among a variety of automated systems that are seldom mutually compatible. Based on discussions in several meetings, the Task Group had identified data elements for purchase order, invoice, claim and status report functions; it suggested that the initial scope of a service model be restricted to these functions, and that the protocol defined for intersystems communication be compatible with ILL and other application protocols that were being developed.

At several meetings in 1983 and 1984, the Task Group reviewed the service and protocol specifications prepared by consultants on contract to the National Library. The syntax issue was left open in view of the existence of several pre-OSI, mutually incompatible but widely used transfer syntaxes in this application. The specifications did not address such issues as accounting and inventory control, as these were considered local system concerns.

The consultants suggested that a sample program of the protocol should be produced which could then be implemented with relative ease in existing acquisitions systems, and that an acquisitions workstation on a microcomputer be developed to allow institutions that have no automated acquisitions system currently in place to participate in a projected field trial. This approach was fully endorsed by the Task Group and accepted by the National Library. A sample program

was produced and a prototype workstation based on a vendor-provided acquisitions system was developed for operation on an MS-DOS-microcomputer.

## 2.3 Interlibrary Loans (ILL)

The ILL service and protocol were specified and trial implementations were undertaken during the period covered by this report. The ground was prepared for this by the iNet field trial, during which the functional scope of the ILL service and the data elements required for the ILL messages were identified.

The Task Group had noted that ILL and acquisitions are applications that could be well supported by the store-and-forward message transfer mechanisms of computer-based message handling systems; the Task Group had in fact recommended earlier that "in identifying protocol requirements for ILL and acquisitions, due consideration must be given to isolating ILL and acquisitions functions that could be supported by general purpose message handling systems now being defined".<sup>6</sup>

The ILL service and protocol was therefore defined to operate on top of store-and-forward messaging facilities provided by the common carriers. The necessary standards for the worldwide interconnection of public and private messaging services have now been defined by CCITT<sup>7</sup>, thus laying the foundation for the orderly growth of message-oriented application protocols.

The Task Group reviewed the ILL service and protocol specifications prepared under contract to NLC, and it approved the use of a transfer syntax that is human readable but adequately structured for machine processing as well. Use of the MARC format was ruled out and the guidelines for Trade Data Interchange (GTDI)<sup>8</sup> syntax were chosen as being more suitable to serve as both local and transfer syntax. It was agreed that at some future date a more efficient transfer syntax should be considered for strictly machine-to-machine communication.

To allow conformance testing and facilitate compatible implementations, an ILL Protocol Testing Facility was designed and implemented more or less concurrently with the ILL work station implementations. The Task Group reviewed the work done on contract, and also discussed general issues related to implementation assessment and conformance testing of application protocols. One important issue was the design

4) P<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub> protocols as defined in the CCITT X.400 Series Recommendations.

5) NISO Draft Standard Z 39.50 (1984)

6) Task Group, *Interim Report*, p. 11.

7) CCITT Recommendations X.400, X.4091, X.408, X.409, X.410, X.411, X.420, X.430 on Message Handling Systems. CCITT, 1984.

8) *Trade Data Interchange Directory*. (n.p.: United Nations Economic Commission for Europe, May 1981).

approach: how to design a testing facility that is largely generic (i.e., protocol-independent) and not tied to specific implementation of any specific protocol, and as such usable in testing several application layer protocols. Another issue was the role of the test facility during the entire life cycle of protocol development. The Task Group's views on this matter are summarized later in Section 4.3.

#### 2.4 Information Search and Transfer (IST)

The Task Group noted that data base search and information transfer between remote systems is an essential aspect of virtually every type of distributed application. Significant benefits could be obtained if application protocols were designed to take advantage of their kinship and common functionality. Indeed, both ISO and CCITT have adopted precisely this approach, namely, of structuring application services and protocols in terms of "common" and "specific" elements. In view of the large functional overlap between IST and the CCITT defined "Remote Operations and Reliable Transfer", the Task Group suggested that these CCITT-defined common elements be incorporated in the specification of an IST service and protocol.

The Task Group also noted that Information Search and Transfer may be conducted either in connection-oriented or connectionless mode. Since there is a requirement for connection-oriented and connectionless implementations to coexist and interwork (e.g., between the LSP and Canadian implementations), the protocol ought to be specified in such a way that both types of implementations are feasible without loss of compatibility.

The NLC was requested to initiate work on Information Search and Transfer as a common application service that could be used in more than one application context. The Task Group reviewed the initial phases of the work done on contract. The IST protocol is intended for communication between intelligent devices and not for dumb terminals wishing to communicate with remote hosts. For users with dumb terminals wishing to interact in a standard way with remote systems, a standard Common Command Language (CCL) has been proposed in ISO. The Task Group has examined this proposed Common Command Language and the Group's views are summarized in Section 5.

With the increased understanding of the OSI upper layers, standards bodies have renewed their search for commonalities among application layer protocols and for a suitable structuring technique. The long term aim in ISO and CCITT is to create a repertoire of common service and protocol elements which may be combined selectively with application specific elements to structure application protocols. This approach is expected to reduce protocol development

efforts and create a better environment for interworking in general and integration of related applications in particular. This is also the approach the Task Group wishes the library community to follow by incorporating the IST protocol in library-specific application protocols requiring search and transfer functions.

#### 2.5 File Transfer Protocol (bFTP)

Work on a basic File Transfer Protocol has been in progress for some time and was reported on briefly in the first interim report of the Task Group. The period covered by the present report saw much activity in this project, including trial implementations in four Canadian library systems. The Task Group reviewed the progress of the work and recommended that the protocol specification be revised for better alignment with the ISO draft proposal for File Transfer Access and Management protocol. A revised version of basic File Transfer was produced by consultants and reviewed by the Task Group.

However, the ISO File Transfer Access and Management is functionally a much richer protocol, extending as it does beyond transfer to remote access and manipulation aspects. Apart from the fact that the revised basic File Transfer still includes a non-OSI Network layer, the issue is still open whether this protocol needs to be brought up to the full functional level of the richer protocol. Nonetheless, the Task Group has little doubt that there is need for a connection-oriented file transfer service in the library applications environment and it therefore fully supports the continuation of work in this area.

In this connection, the Task Group also examined the issue of compatibility between the basic File Transfer and the<sup>10</sup> Linked System Project's Application Layer Protocol<sup>11</sup> in response to the perceived need for future interworking between Canadian and U.S. library systems. The issue is rather complex, as it is tied up with several other as yet unresolved issues, such as the detailed architecture of the OSI upper layers, the scope of bulk data transfer as a common application layer service, the eventual form of the Information Search and Transfer Protocol, and the choice between connection-oriented and connectionless modes of communication. A satisfactory resolution of this issue awaits further developments in the U.S. and Canada.

### 3. ASSISTANCE TO INET PROJECT EVALUATION

The composition of the Canadian library group known as the Bibliographic Common Interest Group (BCIG), and an account of its participation in the iNet trial are reported elsewhere<sup>12</sup>. Suffice it to mention here that

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- 10) Ray Denenberg, "Linked Systems Project, Part 2: Standard Network Interconnection," *Library Hi Tech*, vol. 3, no. 2 (1985), pp. 71-79.
- 11) *Linking: Today's Libraries, Tomorrow's Technologies* (Ottawa: National Library of Canada, 1984).

9) CCITT Recommendation X.410.

iNet's directory facility and its telecommunication services were utilized by the BCIG members to mount several distributed applications and study their operation with a view to identifying future requirements for decentralized open networking among library systems. The Task Group's role in the evaluation of this field trial was limited to technical aspects of protocols for distributed library applications.

In September 1983, the Task Group reviewed the results and conclusions of each individual sub-project. The Task Group suggested the revision of some recommendations as proposed by the project participants, and the addition of new ones to better reflect the protocol issues and the technical concerns underlying BCIG's recommendations. Specifically, the Task Group recommended:

- that a gateway function be implemented to enable all libraries and users of electronic messaging services to interwork regardless of the common carrier network they happen to be attached to;
- that further research be conducted urgently on network directory services, and that a Canadian position be established on the directory question for input to CCITT and ISO;
- that necessary initiatives be undertaken to test the utility of CCITT-defined message transfer services to implement library application protocols;
- that the bibliographic community continue to monitor work on the integration of standards for message handling and telematic services;
- that an alternative to the basic File Transfer Protocol be investigated for the real time transfer of bibliographic records found during an interactive retrieval session with a remote host system.

All of these recommendations have since been acted upon either through the National Library's specific protocol development projects (e.g., the Network Directory Service project) or through the Task Group's regular work program.

#### 4. OSI ISSUES CONSIDERED

Development of OSI application protocols is bound up with broad technical issues that are still being discussed and debated and remain to be authoritatively resolved by ISO and CCITT. The Task Group was concerned that some of these issues be clarified without delay so that the library community might be provided with some guidance. The following issues were considered at some length:

##### 4.1 Connectionless Protocols

Computer communication falls into two broad categories, namely, connection-oriented and connectionless. The differences between the two types – and

they are important – are reflected in the structure and operation of the corresponding protocols. Connection-oriented communication is analogous to two persons conversing over the telephone: establish a connection, carry out data transfer (conversation), and finally, terminate the connection. Two-party interactive communication in real time is connection-oriented.

Connectionless communication is analogous to communication by exchange of telegrams: single self-contained messages or data units are transmitted from one sender to one or more intended recipients without prior negotiation or agreement. This type of communication is hospitable to being conducted directly in real time or indirectly via a store-and-forward facility. Message-oriented communication is a special case of connectionless communication wherein an intermediate store-and-forward message transfer facility is used for transferring messages or data units between sending and recipient systems; in this it is analogous to communication between human beings via the postal service.

Message-oriented communication is particularly appropriate where there is a need for multicasting or broadcasting data units (e.g., distributed data base updates, the same request to multiple hosts) over large distances and different time zones, and where public message transfer facilities are readily available.

Whether library application protocols ought to be connection-oriented or connectionless was a question that was extensively discussed and debated in the Task Group. The issue was not merely a matter of protocol design; it was also tied to questions of economics and flexibility of implementation and the availability of appropriate lower layer services. The choice between connection-oriented and connectionless protocol design is dictated by the nature of the application that the protocol is intended to support. In the Task Group's view, distributed library applications, with some exceptions, do not require real time interactive communication between the communicating end-systems.

The connectionless mode obviates the need for tight coupling between the end systems during data transfer; thereby even incompatible systems can interwork through appropriate conversion facilities provided within the message transfer service. The protocol data units of a connectionless application protocol lend themselves well to transfer by general purpose electronic messaging facilities that are becoming widely available in Canada and abroad. The ability to make use of public message transfer facilities circumvents the need to implement all seven OSI layers in each of the end systems, thereby achieving a certain flexibility and economy in the design and operation of the connectionless application protocol.

The layered architecture of the OSI communication makes it possible for connection-oriented and connectionless protocols to coexist in certain configurations. Indeed, message-oriented application layer

protocols can be designed and implemented so that both connection-oriented and connectionless lower layer facilities may be utilized. This is the approach the Task Group wishes the library community to follow whenever feasible.

The Task Group believes that the CCITT X.400 series recommendations have paved the way for the development of a worldwide communications infrastructure that application protocols can use with advantage. In the long run this is likely to provide all libraries, big and small, with more ubiquitous and economic mechanisms for interworking than is possible through strictly connection-oriented communication.

#### 4.2 Applications Interworking

The Task Group has observed that with growing computerization of library systems and user level services, the need for shared use of bibliographic data among several applications is also growing. If traditionally separate applications such as ILL, acquisitions, cataloguing, reference service, etc., can interwork, then significant economy and speed can be achieved by allowing multiple use of the same data without rekeying what already exists in the system. Unfortunately, separate but related applications or separate implementation of the same application tend to use data structures that differ in syntax as well as in the richness of data content. This problem may be overcome by providing automated facilities for conversion, record definition and such other manipulation of applications data as may be necessary for interworking.

The OSI model in general combined with the detailed architecture of the upper layers now under discussion is expected to provide the necessary framework for library application protocols to evolve towards a truly interworking environment. In such an integrated environment, separate applications, like ILL, acquisitions, IST, etc., can become different application contexts, each of which may utilize such common application services as the directory service or the message transfer service. Application protocols themselves can include mechanisms for switching from one context to another with minimal end user effort. Such an approach would require a global review of all the application protocols developed or planned, and re-examination of the entire applications environment.

#### 4.3 Protocol Testing and Conformance

The Task Group considers the provision of protocol testing facilities as an indispensable part of any protocol development effort. Unfortunately, testing protocol implementations for conformance is a complex new discipline that still lacks a well tried standard methodology. It is therefore all the more important to develop facilities that can be used to:

- assist implementation of the protocol standard;
- perform conformance testing;
- assist in arbitration testing when certified implementations fail to communicate;

- assist in the refinement and maintenance of the protocol standard.

The Task Group foresees that eventually national and international centres will be established to test and certify lower layer protocol implementations. This is, however, unlikely to happen for library application protocols whose use will necessarily be far less universal. Hence, the responsibility for conformance testing and certification of library application protocols devolves directly upon the library community.

The testing facility developed for the ILL protocol was based on a specific implementation of the ILL workstation. The Task Group considers this approach as unnecessarily restrictive and fraught with problems. In the Group's view, a protocol-independent generic facility which can be used to test implementations of more than one protocol would be more economical and maintainable in the long run. In addition, it is desirable that the test facility can handle protocols using diverse coding schemes (e.g., MARC, GTDI, X.409, etc.).

#### 4.4 Library and Office Applications

The Task Group has observed that important similarities exist between library and general office applications, and that in certain areas (e.g., electronic document interchange) the two types overlap significantly. Both application types involve interchange of information and documents for presentation in some human readable form, and neither type requires a tight coupling of end systems for information transfer. These characteristics make both library and office applications ideal candidates for support by general purpose message transfer facilities that are now becoming widely available. Indeed, protocols for library and office applications can be architecturally quite similar; compare, for example, the ILL protocol with the CCITT-defined P<sub>2</sub> protocol for message handling. To all intents and purposes, the communication requirements of library and office applications are identical.

There are other reasons for viewing library and office applications together. Though a variety of document types (e.g., processable/final form, pure text/mixed, formattable/fully formatted) can be identified in the electronic communications environment, none are unique to either the library or the office environment. All can be handled by means of the same set of techniques and procedures. Standards for document architecture, document interchange format, and document content representation (i.e., abstract syntax) are at an advanced stage of development. There can be little doubt that these and other OSI upper layer standards will permit a unified view and a measure of integration of library and office applications.

Considerations of these kinds suggest that a level of integration of office and library applications can be achieved in any one organization on the basis of a common communications infrastructure. Whether the

technologies of local area networks (LAN) or private branch exchanges (PBX) or something else would provide this common base for integration remains to be explored.

#### 4.5 Syntax of User Data

The OSI Reference Model prescribes a clear architectural separation between the semantics (or abstract syntax) and the concrete transfer syntax of user data carried in the protocol data units of application protocols. This is to allow application layer standards to be ideally concerned only with the semantics of user data to be transferred, leaving all aspects of transfer syntax, including syntax transformations, for determination by algorithms forming part of the presentation layer standardization. However, in the absence of a full feature presentation layer, the application layer standard must address the question of (concrete) transfer syntax as well. This is the case with the library application protocols specified so far. The Task Group has extensively discussed this issue, particularly in connection with the review of individual protocol specifications, and some members have felt that library-oriented pre-OSI formats such as MARC are far from ideal as transfer syntax in the OSI environment. What is needed is a powerful technique for representing the semantics and for uniform encoding of user data for **all types** of applications including ones that are of concern to libraries alone.

Such a technique is actually now available as a CCITT recommendation<sup>12</sup> for use in connection with the CCITT application protocols. This same technique is also in the process of being adopted as an ISO standard for use in the definition of ISO application protocols<sup>13</sup>. It is therefore highly desirable to see whether this emerging world standard can provide libraries with a more powerful and forward-looking approach for handling syntax-related issues.

### 5. OTHER ACTIVITIES

During the period covered by this report, a set of standards for interconnecting message handling systems<sup>14</sup> was finalized and formally adopted by the CCITT. The message handling protocols ( $P_1$ ,  $P_2$  and  $P_3$ ) as defined in these standards are a class of application layer protocols. Their detailed specification, the definition of their relationship with one

another and with other application layer entities within the architecture of the OSI Reference Model is an important step forward in the progress towards OSI.

The Task Group reviewed these standards and has come to view them as of particular significance for the development of a family of message-oriented library application protocols. The CCITT's efforts in developing the X.400 series of standards signal the commitment of CCITT member organizations to the provision of not only interpersonal electronic messaging services but also general purpose, application-independent message transfer services that can provide the communications infrastructure for a variety of distributed applications, involving any mixture of data, text, graphics, facsimile, or voice, i.e., any type of information.

The protocol development activities of the Linked Systems Project (LSP)<sup>15</sup> in the United States have resulted in the definition of a connection-oriented application protocol for search and retrieval of bibliographic records between automated library systems. This protocol<sup>16</sup> is now before a subcommittee of the American National Information Standards Organization (NISO) for review and approval as an ANSI standard. In view of this protocol's likely impact on future interworking between U.S. and Canadian library systems, the Task Group examined it in detail with special reference to the Information Search and Transfer protocol now being developed by NLC. In the Task Group's view the NISO Z39.50 protocol as initially proposed did not meet all of our requirements in a more generalized information search and transfer environment. The National Library was advised accordingly and the Task Group's comments were forwarded to NISO for consideration and possible incorporation into the Z39.50 standard.

A subcommittee of the Task Group examined another proposed ISO standard that is of some importance for the future development of a standard user interface to data bases and application systems. As of December 1984, ISO/DP 8777, the proposed draft for a common command language standard did not, in the Task Group's view, meet an important requirement, namely, standard commands for data base update functions that are needed in such library applications as cataloguing; nor did the draft include an implementation-independent service definition. The Task Group approved this standard, nonetheless, on the ground that it represented in its limited way a measure of progress. The Task Group's comments and suggestions

12) CCITT Recommendation X.409: Message Handling Systems: Presentation Transfer Syntax and Notation. CCITT, 1984.

13) ISO DP 8824: Information Processing - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1). ISO DP 8825: Information Processing - Open Systems Interconnection - Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)

14) See footnote 10.

15) CCITT Recommendations X.400, X.401, X.408, X.409, X.410, X.411, X.420, X.430 on Message Handling Systems. CCITT, 1984.

16) American National Standard for Bibliographic Information Retrieval: Application Service Definition and Protocol Specification for Open Systems Interconnection, NISO Z39.50 (1984).

were duly submitted to ISO TC46 (Technical Committee on Documentation), the committee dealing with the standard.

The Task Group has maintained systematic liaison with national bodies like the Canadian Advisory Committees on ISO/TC97/SC16 (now SC21, dealing with OSI) and ISO/TC97/SC18 (dealing with the Text Communication and Office Systems), National Study Group VII (dealing with CCITT's work in OSI) and their international counterparts through the direct participation of several Task Group members in the work of these committees.

The Task Group has also maintained liaisons with the Linked Systems Project, a major undertaking by the U.S. library community for the development of library application protocols, and the NISO subcommittee concerned with the standardization of computer-to-computer protocols for library-oriented applications in the United States. The current chairman of the NISO subcommittee Z39D was a regular participant in the Task Group meetings. Such liaisons have enabled the Task Group to maintain a high level of awareness of OSI developments in Canada and elsewhere, and to obtain useful technical documents which would otherwise be difficult to come by.

## 6. CONCLUSIONS AND RECOMMENDATIONS

In the last four years significant progress has been made in applying the OSI philosophy and its techniques to problems of library systems interconnection and resource sharing, and the general direction of OSI developments is far more discernible now than it was four years ago when the Task Group began its work. Nonetheless, in the absence of an adequate pool of tested knowledge and experience to draw upon, progress must still be made largely through experimentation.

The following recommendations deal with some broad issues of long range consequence. They are calculated to channel the library and information community's efforts along the most promising path.

- a) It seems advantageous for libraries to have their distributed applications supported by a family of protocols that can make use of both connection- and connectionless transfer mechanisms. This orientation should be maintained in so far as it is practicable.
- b) Adequate facilities for implementation assessment and conformance testing of protocols are essential for the realization of OSI. Such facilities for all library Application Layer protocols should be established without delay.
- c) Interworking of library applications is becoming a necessity as much for operating efficiency as for better quality of user level services. To achieve this, a "building blocks" approach to protocol design, based on a unified view of the entire distributed applications environment, should be maintained.

- d) The variety of coding schemes (i.e., formats, syntaxes) currently used to represent applications data is a major impediment to library systems interworking. The CCITT developed scheme (CCITT Recommendation X.409) promises to gain worldwide acceptance for the representation and uniform encoding of user data for all types of applications. The utility of using this standard as opposed to other options for library protocols should be further explored.
- e) Growth of distributed processing in libraries has created a need for integrating multiple processors and multiple applications in an architecture that is consistent with OSI and hospitable to local and remote resource sharing. Libraries and library system and service vendors should begin to explore how such integration may be achieved.
- f) The Task Group's liaisons with standardization bodies and its monitoring of OSI development work in Canada and abroad are essential to its effective functioning. Such activities should be continued.
- g) There is a need for better alignment of protocols that support library applications and that are being developed independently in Canada and the U.S. The National Library of Canada and the Library of Congress should continue to promote this alignment through consultation and a mutually agreed program of action.
- h) The Task Group's original terms of reference should be reviewed in the light of experience, and revised terms of reference should be proposed to better reflect the present scope and orientation of its work.

## APPENDIX A:

### Members of the Task Group\*

Eric Anttila (NABU Computers, Inc.)

Robert Baird (Canadian Telebook Agency)

Gregor V. Bochmann (Université de Montréal)

Edwin J. Buchinski (National Library of Canada), Chairman

Richard Chung (CNCP Telecommunications)<sup>1</sup>

Gene Damon (GEAC Computers International, Inc.)

Ray Denenberg (Library of Congress and NISO Z39D Chairman),  
Observer

James Howse (UTLAS, Inc.)<sup>2</sup>

Mazharul Islam (National Library of Canada), Secretary

Robin MacDonald (University of British Columbia Library)

William A. McCrum (Department of Communications, Government  
of Canada)

Ostap Monkewich (Department of Communications, Government of  
Canada)<sup>3</sup>

Walter Neilson (Alberta Research Council)

Gerald Neufeld (University of Waterloo)<sup>4</sup>

William Newman (National Library of Canada)

Oskar Stubits (CNCP Telecommunications)

Patrick R. Shea (Telecom Canada)<sup>5</sup>

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\* As of December 1984, Eric Anttila, Walter Neilson and Patrick Shea are no longer members of the Task Group.

1) Alternate for Oskar Stubits.

2) Starting September 1984; until then Phyllis Wharton represented UTLAS, Inc.

3) Alternate for William McCrum.

4) Starting September 1984.

5) Starting September 1983; until then Robert Blackshaw represented Telecom Canada.

## APPENDIX B:

### Proposed list of tasks to be undertaken by the Task Group for the period January 1985-December 1986

This proposed list and schedule is based on the assumption that most of the detailed work of feasibility analysis, service and protocol specifications, etc., will be contracted out to technical experts, as necessary. It is also assumed that draft service and protocol specifications will be available from various standards organizations to support and complement the contracted work.

<u>Task</u>	<u>Schedule</u>
1. Assist the harmonization of the Information Search and Transfer (IST) and the NISO Z39.50 Information Retrieval protocols.	Spring/Fall 1985
2. Review the functional reference model for cataloguing application.	Spring 1985
3. Determine the service elements required for the cataloguing application and undertake their development, if necessary.	Fall 1985
4. Review the design and specification of a generic protocol-independent testing facility for testing multiple application protocols.	Fall 1985
5. Review the progress in the implementation and operation of the generic testing facility. Align the implementation with ISO guidelines/standards on conformance testing.	Fall 1986
6. Explore the Task Group's role and function in converting library application protocols to Canadian national standards.	Spring/Fall 1985
7. Determine the nature and scope of conversion facilities required to support interworking of applications that use incompatible data structures and coding schemes.	Spring 1986
8. Determine the applicability of the X.409 syntax in library application protocols.	Fall 1985
9. Examine the need for and utility of restructuring library application protocols in terms of Common and Specific protocol components.	Spring 1986
10. Re-examine the issue of full alignment of the bFTP with the ISO FTAM and the relationship of bFTP to the Information Search and Transfer protocol.	Fall 1986
11. Review the study on the feasibility of integrating library and office applications on the basis of a communications infrastructure provided by local area networks, PBX, etc.	Fall 1985

12. Review the progress of the directories project (NDS) with special reference to the harmonization of NDS, IST, CCITT work on Directories and MHS protocols.	Spring 1986
13. Review the progress of the acquisitions protocol implementation and determine the need for additional functional capabilities.	Summer 1986
14. Review the progress in the standardization of document architecture and document interchange formats for electronic publishing and general office communication.	Fall 1986
15. Review results of the File Transfer and ILL field trials and make protocol-related recommendations as appropriate.	Fall 1985
16. Review OSI protocol development activities of ISO, CCITT and other standards organizations, and determine their utility and probable impact on library network development.	Ongoing
17. Maintain liaison with NISO Z39D, LSP, ISO/TC46 and other bodies, as necessary, to keep abreast of library application protocol development efforts in the United States and abroad.	Ongoing
18. Maintain active links with Canadian national bodies such as CAC/TC97/SC21, CAC/TC97/SC18, CAC/TC97/SC6 and CCITT NSG VII and any others through which Canadian contributions to OSI standardization are made.	Ongoing

## APPENDIX C:

### Notes and abbreviations

#### CCITT

Comité consultatif international télégraphique et téléphonique.

A committee of the International Telecommunications Union, an agency of the United Nations. CCITT is the primary and most influential organization for developing telecommunication standards. CCITT's work is carried out in various Study Groups (SG) supported by corresponding National Study Groups (NSG) of member countries. Canadian contribution to CCITT's work in OSI is made primarily through the Canadian NSG VII.

#### CCITT SG VII

This is the Study Group that defines standards for data communication networks. Many of the X-series Recommendations (e.g., X.25, X.400 series) are the work of this SG. This is the group also responsible for CCITT's work related to OSI. Canadian contribution to the SG's work is provided through the NSG VII.

#### CCITT Recommendations

These are CCITT standards; they are more binding on CCITT members than ISO standards, which are purely voluntary, on ISO members.

#### GTDI

The message syntax as defined in the "Guidelines for Trade Data Interchange" prepared originally for the United Nations Economic Commission for Europe.

#### ISO

International Organization for Standardization. It is one of the two formally constituted and internationally supported organizations concerned with standardization affecting various aspects of computer communication. The other organization is CCITT. ISO is representative of national standards organizations of each member country. Canada is represented through the Standards Council of Canada (SCC). ISO coordinates its activities with CCITT through formal liaisons on common issues, such as the OSI Reference Model, protocol standards at various layers, etc. Canadian contribution to ISO's work in the field of OSI standardization is made through Canadian Advisory Committees such as CAC/TC97/SC21 and SC18.



## ANNEXE C

### CITT

### Notes et abréviations

ISO International organization for standardization

Organisation internationale de normalisation. C'est l'un des deux organismes officielslement constitués et jouissant d'appuis internationaux qui occupent de la normalisation de différents aspects des communautés internationaux de chaque pays membre. Au sein de l'ISO sont représentés les organismes de normalisation nationaux de chaque pays membre. Le Canada y est représenté par le Conseil canadien des normes (CCN). L'ISO coordonne ses activités avec les normes internationales de chaque pays membre. Au sein de l'ISO sont représentés les organisations internationales de normalisation de chaque pays membre. L'autre organisme est le CITT. Le CITT est l'organisation de normalisation principale et travaille à l'accomplissement de ses activités avec les groupes de travail appuyés par leurs membres. Les groupes de travail nationaux des pays membres. La CITT en étatuaient en matière de télécommunications. Le plus influent en matière de normalisation des télécommunications, au sein de l'ISO, sont les organisations internationales de normalisation de chaque pays membre.

C'est le groupe qui détermine les normes des réseaux de transmission de données. Plutôt que des avis de travail de ce groupe, les séries X.25, X.400 sont des séries X (par exemple, les séries X.25, X.400) sont également utilisées pour la transmission de données. Plusieurs des avis de travail de ce groupe déterminent les normes des séries X.25, X.400.

NSC VII. C'est le groupe qui détermine les normes des réseaux de transmission de données. Plusieurs des avis de travail de ce groupe déterminent les normes des séries X.25, X.400.

### CITT SG VII

NSC VII. L'intermédiaire du groupe détermine les normes internationales au travail du CITT sur les groupes de travail nationaux des pays membres. La CITT en étatuaient en matière de télécommunications. Le plus influent en matière de normalisation des télécommunications, au sein de l'ISO, sont les organisations internationales de normalisation de chaque pays membre. L'autre organisme est le CITT. Le CITT est l'organisation de normalisation principale et travaille à l'accomplissement de ses activités avec les groupes de travail nationaux des pays membres. La CITT en étatuaient en matière de normalisation des télécommunications. Le plus influent en matière de normalisation des télécommunications, au sein de l'ISO, sont les organisations internationales de normalisation de chaque pays membre.

Comité consultatif international télégraphique et téléphonique.

Avvisi du CITT. Ce sont des normes du CITT. Elles exercent une plus grande contrainte sur les membres du CITT que les normes de l'ISO, qui sont purement facultatives, le front sur les membres de l'ISO.

Il sagit de la syntaxe des messages qui est définie dans les "Guidelines for Trade Interchange", préparée d'abord pour la Commission économique des Nations unies pour l'Europe.

### GTDI



TACHES		CALENDRIER	
1.	Aider à l'harmonisation du protocole de recherche et de transfert de l'information de la Bibliothèque nationale du Canada avec les protocoles Z39.50 de la NISO sur la recherche documentaire.	Printemps 1985	1985 à janvier 1987
2.	Étudier le modèle de référence fonctionnel pour le catalogue.	Printemps 1985	d'enprendre au cours de la période allant de janvier
3.	Determiner les éléments de service nécessaires à l'application de catalogue et entreprendre leur élaboration, au besoin.	Automne 1985	que la majorité des travaux détaillés relatives aux études de faisabilité, à la spécification des services et protocoles, etc. servent sous-traites, au besoin, par des spécialistes. Le Groupe suppose également que des spécifications proposées des services et des protocoles soient établies par les sous-traitants.
4.	Étudier la conception et la spécification d'une installation d'essai générale, indépendante d'un protocole en particulier, pour faire l'essai des protocoles d'application multiples.	Automne 1985	que la majorité des travaux détaillés relatives aux études de faisabilité, à la spécification des services et protocoles, etc. servent sous-traites, au besoin, par des spécialistes. Le Groupe suppose également que des spécifications proposées des services et des protocoles soient établies par les sous-traitants.
5.	Suivre de près la mise en œuvre et le fonctionnement de l'installation d'essai générale. Rendre la mise en œuvre compactable avec les normes directives de l'ISO sur les essais de conformité.	Automne 1986	que la majorité des travaux détaillés relatives aux études de faisabilité, à la spécification des services et protocoles, etc. servent sous-traites, au besoin, par des spécialistes. Le Groupe suppose également que des spécifications proposées des services et des protocoles soient établies par les sous-traitants.
6.	Étudier le rôle et les fonctions du Groupe de travail dans la conception des protocoles d'appli- cation bibliographiques en fonction des normes nationales canadiennes.	Printemps et Automne 1985	que la majorité des travaux détaillés relatives aux études de faisabilité, à la spécification des services et protocoles, etc. servent sous-traites, au besoin, par des spécialistes. Le Groupe suppose également que des spécifications proposées des services et des protocoles soient établies par les sous-traitants.
7.	Determiner la nature et la portée des mécanismes de conversion requis pour soutenir l'exploitation de conversion régulière des protocoles d'appli- cation bibliographiques du consortium des normes canadiennes.	Printemps 1986	que la majorité des travaux détaillés relatives aux études de faisabilité, à la spécification des services et protocoles, etc. servent sous-traites, au besoin, par des spécialistes. Le Groupe suppose également que des spécifications proposées des services et des protocoles soient établies par les sous-traitants.
8.	Determiner l'application de la norme X.409 aux protocoles d'applications bibliographiques.	Automne 1985	que la majorité des travaux détaillés relatives aux études de faisabilité, à la spécification des services et protocoles, etc. servent sous-traites, au besoin, par des spécialistes. Le Groupe suppose également que des spécifications proposées des services et des protocoles soient établies par les sous-traitants.
9.	Étudier le besoin et l'utilité de restructurer les protocoles d'applications bibliographiques du point de vue des composantes communiques et parti- culières des protocoles.	Printemps 1986	que la majorité des travaux détaillés relatives aux études de faisabilité, à la spécification des services et protocoles, etc. servent sous-traites, au besoin, par des spécialistes. Le Groupe suppose également que des spécifications proposées des services et des protocoles soient établies par les sous-traitants.

## Membres du Groupe de travail\*

### ANNEXE A

Eric Anttila (NABU Computers, Inc.)<sup>1</sup>

Robert Baird (Canadian Telephone Book Agency)<sup>2</sup>

Gregor V. Bochmann (Université de Montréal)<sup>3</sup>

Edwin J. Buchinski (Bibliothèque nationale du Canada), président

Richard Chung (Telecommunications CNCP)<sup>1</sup>

Gene Damon (GEAC Computers International, Inc.)

Ray Denenbourg (Library of Congress et président de la NISO Z39D), observateur

British Columbia (Bibliothèque nationale du Canada), secrétaire

William A. McCrum (ministère des Communications, Gouvernement du Canada)<sup>4</sup>

Ontario Monkgwich (ministère des Communications, Gouvernement du Canada)<sup>5</sup>

Walter Neilison (Alberta Research Council)

Gerald Neufeld (Université de Waterloo)<sup>4</sup>

William Newman (Bibliothèque nationale du Canada)

OSkar Stubits (Telecommunications CNCP)

Patrick R. Shea (Telecom Canada)<sup>5</sup>

En décembre 1984, Eric Anttila, Walter Neilison et Patrick Shea ont cessé d'être membres du Groupe de travail.

1. Alterne avec Oskar Stubits.

2. Depuis septembre 1984; jusqu'à, Phyllis Wharton représente

3. Alterne avec William McCrum.

4. Depuis septembre 1984; jusqu'à, Robert Blackshaw

5. Depuis septembre 1983; jusqu'à, Robert Blackshaw

représenteait Telecom Canada.



14. **ISO/DP/8824: Systems Interconnection - Open Systems Information Retrieval: Application Service Definition and Protocol Specification for Bibliographic Information Retrieval** (1984).

15. **Avis du CCITT X.400, X.401, X.408, X.409, X.410, X.411, X.420 et X.430 sur les systèmes de traitement des messages. CCITT, 1984.**

16. **American National Standard for Bibliographic Information Retrieval: Application Service Definition and Protocol Specification for Open Systems Interconnection** (1984).

17. **ISO/DP/8825: Information One (ASN.1) Abstract Syntax Notation - Specification of Systems Interconnection** (1984).

18. **ISO/DP/8826: Basic Encoding Rules for Abstract Syntax Notation One (ASN.1) for Systems Interconnection Processing - Open Systems Interconnection Notation One (ASN.1) Abstract Syntax Notation - Specification of Systems Interconnection** (1984).

19. **ISO/DP/8827: CCITT X.409: Message Handling Systems: Presentation Transfer Syntax and Notation** (1984).

### 5. AUTRES ACTIVITÉS

#### 4.3 Syntaxe des donnees des utilisateurs

Ces réflexions nous portent à croire qu'une certaine intégration des applications bibliographiques peut être atteinte dans tout établissement, pourvu que certaines prémisses soient remplies. Ces applications peuvent être utilisées dans toute une série de communautés communes. Il reste à voir si les technologies de réseaux locaux (LAN), des autoroutes de commutateurs privés (PBX), ou quelque chose d'autre, pourraient servir de base commune à cette intégration.

## bibliographiques et bureautiques.

#### 4.4 Applications bibliographiques et bureautiques

centre bibliothéquées. Le Groupe de travail considère cette façon de procéder initialement restrictive et extrêmement problématique. Selon une systéme générale, indépendante des protocoles, qu'il pourra être utilisée pour effectuer les essais d'implémentation de plusieurs protocoles, seraient plus économiques et plus faciles à entretenir à la longue. En outre, il est souhaitable que le système retenu puisse recevoir des protocoles utilisant différents codes (par exemple, MARC, GTDI, X.409, etc.).

Le système mis au point pour tirer l'essai du protocole de prêt entre bibliothèques était fondé sur une implication négociée entre les deux bibliothèques. La mise en place de ce système a été facilitée par la volonté de la bibliothèque de l'Université de Montréal de mettre en place un partenariat avec la bibliothèque de l'Université de Sherbrooke. La mise en place de ce partenariat a été facilitée par la volonté de la bibliothèque de l'Université de Montréal de mettre en place un partenariat avec la bibliothèque de l'Université de Sherbrooke.

alider à l'implémentation de la norme sur les protocoles, effectuer des essais de conformité, redistribuer, dans un contexte d'arbitrage, à des essais lorsquе, même si une implémentation de protocole a été certifiée, la communication ne se fait pas ! aider au perfectionnement et à la tenue à jour de la norme sur les protocoles.

Le Groupe de travail considère l'tablissement d'installations d'essai des protocoles comme un point indispensible de tout effort d'élaboration des protocoles. Malheureusement, l'essai des implantations closes. Malheureusement, l'essai des méthodes proposées par une discipline nouvelle et complexe qui, encore, ne peut s'appuyer sur une méthode éprouvée et normalisée. Il est donc de la plus haute importance d'élaborer des installations utilisables pour : d'après les résultats de la présente étude.

#### 4.3 Essai et conformité des protocoles

#### 4.2 Intégration de données d'applications

Les applications bibliographiques de travail, les applications documentaires et les applications de gestion de l'information sont des systèmes des utilisateurs qui communiquent entre eux.

#### 4.1. FRUSTRATIONS IN MODE SARS COMMUNICATION

# EL GUIDE DE GOES TIONS RELATIVES A L'INTERCONNEXION DES SYSTEMES OUVERTS

11. Le siège central des bibliothèques d'aéroports de la bibliothèque nationale du Canada (par exemple, les projets de délibération de protocoles particulières de la bibliothèque nationale du Canada) devrait être établi régulièrement par le groupe de travail. Le projet de service de répertoires des resseaux, soit dans le cadre de l'entente entre les bibliothèques d'aéroports de la bibliothèque nationale du Canada, 1984).

qui nous moyens d'autre que le protocole de transfert de soi étudie soit étudie soit transfert en temps réel des notices bibliographiques préférées au cours d'une session avec un consultant en interaction interactive à distance avec un ordinateur.

que les bibliothécaires continuent de suivre le travail d'intégration des normes relatives aux bibliothèques de traitement des messages et de quelque matique;

que l'on prenne les initiatives nécessaires pour vérifier l'utilité des alternatives nécessaires pour sages définitions par le CITT dans la mise en oeuvre des protocoles d'applications bibliographiques;

que de plus amples recherches sur les services de répertoriés de réseaux soient menées très rapidement, qu'une position canadienne sur la question des répertoriés soit établie et que celle-ci soit communiquée au CITT et à l'ISO.

pour une licence de nouveau de traiter soit implanter soit remplacer tous les utilistateurs de services de courrier électronique de communiquer entre eux, quel que soit leur système de télécommunications analogues ou tout autre.

En septembre 1983, le Groupe de travail a étudié les résultats et conclusions de chaque sous-projet. Il a suscité que certaines recommandations proposées par les participants du projet soient revues et que des recommandations additionnelles soient formulées afin de mieux refléter les fonctions de protocole et les procédures techniques sous-tendant les recommandations du GSB. Plus précisément, le Groupe de travail a recommandé

## 2.5 Protocole de transfert de fichiers

### 3. ASSISTANCE A L'ÉVALUATION DU PROJET

Le protocole de l'ISO est cependant beaucoup plus riche, du point de vue fonctionnelle, puisqu'il va au-delà du transfert et de l'exploit d'accès à distance et la manipulation de documents. Mais à part le fait que le protocole de transfert de fichiers de base comprend tous les outils nécessaires à une utilisation efficace de l'ordinateur, il possède également des fonctionnalités supplémentaires qui sont utiles dans le travail dans ce secteur.

## 2.4 Recherche et transfert d'information

### 2.3 Prêt entre bibliothèques

Cette application, qui traite de la commande et de l'acquisition de documents et met en cause les bibliothéques, les librairies et les éditeurs, exige un changement d'information entre différents systèmes informatiques compatibles les uns avec les autres. Suite à de nombreux erreurs de travail, le groupe de travail a déterminé des éléments de données pour les fonctions

## 2.2 Acquisitions

3. Voir le Rapport d'étape du Groupe de travail sur les protocoles de communication ordinaires pour l'échange de données bibliographiques (Ottawa: Bibliothèque nationale du Canada, 1983), annexe D.

On reconnaît bien maintenant le rôle central que joue un système de représentations dans l'exploitation efficace d'un réseau de systèmes ouverts. La période que nous examinons a vu à la fois le CITT et l'ISO prendre des travaux sur les représentations. Cependant, l'unanimité n'est pas faite sur les fonctions ou les caractéristiques opérationnelles d'un service de représentation OSI et ce n'est probablement pas avant deux ou trois années que l'on peut espérer voir le CITT et l'ISO arriver à un accord sur les représentations bibliographiques progressait, la question des représentations spécifiques à ce sujet. A mesure que le travail sur de nombreuses applications proposer des spécifications définitives à ce sujet. L'ISO a mis en place une commission de travail sur les spécifications de la bibliographie pour élaborer une norme de bibliographie standard. La commission de travail sur les spécifications de la bibliographie standard a été créée en 1980 et a été chargée de développer une norme de bibliographie standard pour l'ensemble des applications. La commission de travail sur les spécifications de la bibliographie standard a été créée en 1980 et a été chargée de développer une norme de bibliographie standard pour l'ensemble des applications.

## 2.1 Service de répertoires de réseaux

La modélisation d'applications réparties ainsi que la conception, la spécification et la mise en œuvre de protocoles de soutien du modèle OSI forment une discipline relativement nouvelle et en évolution rapide. Le Groupe de travail a servi de tribune aux bibliothécaires pour la solution de questions techniques et pratiques de travail dans des projets particuliers. Le reste de cette section est consacrée à l'engagement du veau en matière de services bibliographiques. Les deux dernières sections décrivent les résultats de deux études de diffusion d'idées et de concepts nouveaux dans le domaine de l'information et de l'éducation.

Au cours de cette période, les travaux du groupe de projets particuliers entrepris par la Bibliothèque nationale. Même si le travail détaillé sur les spécifications des services et des protocoles a été effectué à l'extérieur, il revient au Groupe de s'assurer que ce travail a été intégré dans les systèmes ouverts et aux réseaux techniques de l'Intranet bien fait, qu'il répondrait aux besoins de travailleurs de l'Intranet et qu'il tenterait de travailler avec les systèmes similaires utilisées ailleurs.

# ASSISTANCE AU PROGRAMME DELABORATION DE PROTOCOLES DE LA BIBLIOTHEQUE NATIONALE

Le groupe de travail a pu s'acquitter de toutes les tâches qu'il a été défini de nombreux sujets de travail, éclairer un certain nombre de questions techniques importantes et orienter la formulation future des protocoles. La liste des tâches précises que le Groupe de travail souhaite entreprendre au cours des deux prochaines années fait l'objet de l'annexe B du présent rapport.

De nombreux projets sont en cours ou en cours de planification à l'heure actuelle. Ces projets ont pour but de développer l'industrie et l'agriculture, de créer de nouveaux emplois et de stimuler l'économie régionale. Ils visent à améliorer les infrastructures, à développer les ressources naturelles et à promouvoir l'innovation et la recherche. Ces projets sont financés par le gouvernement, les entreprises privées et les organismes internationaux. Ils sont également soutenus par les communautés locales et les groupes d'intérêt. Ces projets ont un impact positif sur l'économie régionale et contribuent à l'amélioration de la qualité de vie des citoyens.

2. Systèmes de raccordement de l'information - Interconnection de systèmes ouverts - Modèle de référence de base, ISO 7498-1984; Modèle de systèmes ouverts - Structure et fonctionnement des systèmes d'information, CCITT X.200, Avis du CCITT X.200, 1984.

11. On trouvera une description de ces organismes et de leurs activités à l'annexe C.

Au cours de cette période, le programme de collaboration des Protocoles de la Bibliothèque nationale a connu une activité intense et, par voie de conséquence, un

## 1. INTRODUCTION



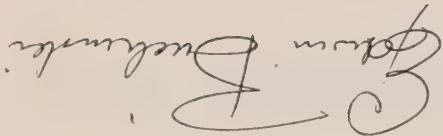
9	A:      Membres du Groupe de travail
10	B:      Liste proposée de tâches à entreprendre
11	C:      Notes et abbreviations
12	

## Annexes

8	6.      Conclusions et recommandations
7	5.      Autres activités
7	4.3      Syntaxe des données des utilisateurs bureautiques
6	4.4      Applications bibliographiques et éssai et format de protocoles
5	4.1      Protocoles en mode sans connexion
5	4.2      Intégration de données
5	4.      Étude de questions relatives à l'interconnexion des systèmes ouverts
4	3.      Assistance à l'évaluation du projet Internet
4	2.5      Protocole de transfert de fichiers
3	2.4      Recherche et transfert d'information
2	2.3      Prêt entre bibliothèques
1	2.2      Acquisitions
1	2.1      Service de répertoires de réseaux
1	2.      Assistance au programme délibération des protocoles de la Bibliothèque nationale
1	1.      Introduction



Edwin Buchinski



Le Président,

Veuillez agréer, Madame, l'expression de mes sentiments respectueux.

A titre de président du Groupe de travail sur les protocoles de communication/réseaux pour l'échange de données bibliographiques, je vous présente ce deuxième rapport qui comprend les activités et les recommandations du Groupe pour la période s'étendant de janvier 1983 à décembre 1984 inclusivement. Le Groupe propose également une liste de tâches à entreprendre au cours des deux prochaines années.

Madame,

Bibliothèque nationale du Canada  
Directeur général  
Madame Marianne Scott

Le 6 septembre 1985

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